CLAIMS

1. A process for the non-invasive in vivo characterization and analysis of the reactivity and/or hypersensitivity of a skin zone on the face or optionally appendages of the skin or optionally the scalp by determining the conductivity of the nerves in that region, characterized in that:

- two non-invasive electrodes (1,1') are applied, at least one of the two electrodes being applied to a specific point of the zone of the skin to be analyzed, the measuring point, in order to determine the electrical activity of the nerves of the skin and/or the subcutaneous nerves at that point or even the electrical activity of the brain. These electrodes are associated with a circuit for evaluating the signals detected by the electrodes, this evaluation circuit comprising amplifying elements (2, 2', 3), processing elements (7) and recording elements for the signals and also a microprocessor (8),
- the skin zone to be analyzed is exposed to a stimulation, more particularly an electrical stimulation, and
- the changes in the electrical signals detected by the electrodes (2, 2') driven by this stimulation as a function of time are analyzed.

2. A process as claimed in claim 1, characterized in that the skin zone to be analyzed is subjected to a stress, for example a chemical or a physical stress, more particularly an electrical, mechanical, electromechanical or thermal stress, and the changes as a function of time in the signals detected by the electrodes (1, 1') driven by the stimulation - with and without stress - are compared.

3. A process as claimed in claim 1 or 2, characterized in that at least one of the measuring electrodes (1, 1') is so positioned that it transmits signals representative of the electrical activity of one of the branches, more particularly the maxillary branch of the trigeminal nerve, to the evaluation

circuit.

4. A process as claimed in any of claims 1 to 3, characterized in that at least two measuring electrodes (1, 1') are applied to the skin zone to be analyzed, at least one (1) of these measuring electrodes being so designed that it can measure the impedance of the skin, and in that a weak alternating current is applied to at least a first measuring electrode (1) in order to measure the impedance of the skin at the associated measuring point.

5. A process as claimed in claim 4, characterized in that the measuring electrode(s) (1, 1') are positioned according to the value of the skin impedance.

6. A process as claimed in claim 5, characterized in that the electronic system (2, 2') can increase the potential difference between the electrodes 1 and 1' without transmitting the common-mode signal.

7. An apparatus for using the process claimed in any of claims 1 to 6, characterized in that it comprises:

- at least one non-invasive measuring electrode (1, 1') which is suitable for detecting the signals representative of the electrical activity of the sensory nerves of the skin and/or the sensory subcutaneous nerves at the level of a specific zone of the skin to be analyzed or even the electrical activity of the brain,
- at least one stimulation electrode (13, 13') associated with an electrical stimulator (14),
- a non-invasive reference electrode (5) and
- a circuit for evaluating the signals detected or transmitted by the electrodes (1, 1', 5, 13, 13') which comprises amplifying elements (2, 2', 3), processing elements (7) and elements for recording those signals and a microprocessor, so that curves representative of the changes as a function of time in the signals detected by the

measuring electrode (1,1') after a stimulation can be created and displayed.

8. An apparatus as claimed in claim 7, characterized in that the measuring electrode(s) (1, 1') are non-polarizable or weakly polarizable and, more particularly, are made of stainless steel, tungsten or a noble metal, such as Au or Ag/AgCl.

9. An apparatus as claimed in claim 7 or 8, characterized in that the measuring electrode(s) (1, 1') is/are mounted on the end of a hinged arm (9, 9') and held on the head of the subject by an adaptable holder (10)

10. An apparatus as claimed in any of claims 7 to 9, characterized in that it comprises at least two measuring electrodes (1, 1') of which at least one (1) is so designed that it can measure the impedance of the skin.

11. An apparatus as claimed in claim 10, characterized in that it comprises at least one adjustable voltage generator (20) which is associated with at least one transmitting aerial (12) designed to be erected in the vicinity of at least one measuring electrode (1) in order to enable the skin impedance to be measured.

12. An apparatus as claimed in any of claims 7 to 11, characterized in that the preamplifying elements comprise at least one preamplifying module (2, 2') for the signals detected by the measuring electrode(s) which consists of at least one preamplifier, of which the input impedance is high over a broad voltage range of at least + or – 3 volts.

13. An apparatus as claimed in any of claims 7 to 12, characterized in that the preamplifier is directly connected to an electrode (5) positioned in a zone to be determined.

14. An apparatus as claimed in claim 12, characterized in that the preamplifiers (2, 2') are located in the immediate vicinity of one of the measuring electrodes (1, 1') or the associated measuring electrode.

15. An apparatus as claimed in claim 12, characterized in that the

measuring electrode(s) (1, 1') is/are connected to the input of the associated preamplifier (2, 2') by (a) shielded cable(s) (17, 18, 19, 17', 18', 19').

16. An apparatus as claimed in claim 15, characterized in that the shield(s) (17, 17') of the shielded cable(s) (19, 19') is/are connected to the output(s) of an amplifier/the amplifiers (2,2').

17. An apparatus as claimed in any of claims 7 to 16, characterized in that the processing elements comprise at least one analog/digital converter (7).

18. The use of the apparatus claimed in any of claims 7 to 17 in the cosmetics field.